

**ABSTRACT**

A process for preparing free-flowing, phase-stabilized ammonium nitrate comprises the following steps. A solution of ammonium nitrate (12), a surfactant (13), a phase stabilizer (26), and an inert liquid (20) is prepared. The solution is atomized to form a stream of droplets. The droplets are freeze-dried to form agglomerates (54) of crystals of phase stabilized ammonium nitrate. The crystals of phase stabilized ammonium nitrate in the agglomerates are coated with a film comprising the surfactant. The agglomerates are disintegrated into separated free-flowing phase stabilized ammonium nitrate in the agglomerates crystals coated with a film comprising the surfactant.